In order to realize high resistance change rates in such ultra-thin spin valve films, it is desirable that 1) the ferromagnetic layers A and B in the pinned magnetic layer are of an alloy of CoFe, CoNi or CoFeNi having a stable fcc phase, 2) even in the free layer, used is Co or an alloy of CoFe, CoNi or CoFeNi at least in the vicinity of the interface between the free layer and the nonmagnetic spacer layer, and 3) in the antiferromagnetic film, used is an antiferromagnetic layer containing a noble metal element, such as PtMn, PtPdMn, IrMn, RhMn, RhRuMn or the like.

The second problem with HD larger than LD is the Barkhausen noise. In a conventional abutted junction type spin valve device in which the electrode spacing is nearly the same as the longitudinal bias film spacing HMD, HMD is smaller than HD whereby the free layer is rectangular, having a longer side in the HD direction, and the magnetization direction of the free layer is readily oriented in the height direction in which the intensity of the antimagnetic field is smaller. As a result, a Barkhausen noise occurs in this. As opposed to this, since side of the rectangular spin valve film in the invention is longer in the track width direction as HMD is larger than HD therein, the magnetization direction of the free layer is prevented from being oriented in the height direction. As a result, removing the Barkhausen noise from the device of the invention is easy. For these reasons, the yield of heads

comprising the device of the invention is high.

Concretely, cases of 1) HD = 0.5 μm, LD = 0.45 μm, HMD = 1.3 μm, and 2) HD = 0.4 μm, LD = 0.35 μm, HMD = 0.8 μm much enjoy the effect of the invention.

In the constitution of Fig. 29, the pinned magnetic layer is disposed between the free layer and the substrate. The same mentioned herein shall apply to other cases where the free layer is disposed between the substrate and the pinned magnetic layer.

Sixth Embodiment:

Fig. 31 shows still another embodiment of the invention. A substrate, a lower shield and a lower gap (all not shown) are formed, and a pair of longitudinal bias layers 15 are formed thereon according to a lift-off method or to any other dry process of ion milling, reactive ion etching or the like. In Fig. 29, one example of the longitudinal bias layers is shown, which is a laminate comprising a underlayer 153 suitable to an antiferromagnetic layer, an antiferromagnetic film 152 of IrMn, RhMn, CrMn or the like, and a ferromagnetic film 151 of CoFe, NiFe, Co or the like, as in the second embodiment. To this case, any other types of longitudinal bias layers such as those illustrated in the second embodiment could apply.

A spin valve film 13 is formed over the structure formed in that manner. In the spin valve film 13, it is desirable that the free layer 143 is disposed nearer to the substrate

than the pinned magnetic layer so as to facilitate the easy contact between the longitudinal bias layers 15 and the free layer 143. This is for the purpose of more effectively applying the bias magnetic field from the longitudinal bias layers to the free layer 143. It is also desirable that the thickness of the underlayers 141 and 142 below the free layer 143 is 10 nanometers. This is also for the purpose of more effectively applying the bias magnetic field from the longitudinal bias layers to the free layer 143. It is further desirable that the face-to-face contact region between the spin valve film 13 and the longitudinal bias layers 15 is minimized as much as possible to prevent the Barkhausen noise.

Above the spin valve film 13, formed are a pair of electrodes 16 according to a lift-off method, an ion milling method or a reactive ion etching method. Though not shown, an upper gap, an upper shield and a recording part are formed over the film 13.

Like in the fifth embodiment, HD is larger than LD but is smaller than HMD. With that constitution, reproducing heads suitable to narrow track width could be fabricated at high yields. Since the total thickness of the pinned magnetic layer, the nonmagnetic spacer layer and the free layer is at most 14 nanometers, the resistance of the spin valve film 13 is increased and the reproduction output is increased. With that constitution, high-sensitivity magnetoresistance effect